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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/666,090	09/19/2003	Robert C. Lam	02074/02091	8977
43215	7590	03/08/2006	EXAMINER	
BORGWARNER INC. PATENT DEPARTMENT 3850 HAMLIN ROAD AUBURN HILLS, MI 48326-2872				SPERTY, ARDEN B
		ART UNIT		PAPER NUMBER
				1771

DATE MAILED: 03/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/666,090	LAM ET AL.	
	Examiner	Art Unit	
	Arden B. Sperty	1771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 03 January 2006.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-4 and 6-30 is/are pending in the application.
- 4a) Of the above claim(s) 18-27 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-4, 7, 8, 10, 12, 14, 15, 17, 29 and 30 is/are rejected.
- 7) Claim(s) 6, 9, 11, 13, 16 and 28 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ |

NON-FINAL OFFICE ACTION

1. Applicant's amendment and comments have been received and entered per the Request for Continued Examination (RCE), dated January 03, 2006.
2. The 35 USC 112, second paragraph, rejection stated in the previous office action is withdrawn per Applicant's remarks. Applicant's comments sufficiently explain the differences between diatomaceous earth and silica.
3. The previously stated prior art rejection is withdrawn per Applicant's amendment and comments, as detailed below. Despite this advance, the claims remain rejected in light of an updated search of the prior art.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-4, 7, 14, 29 and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 4543106 to Parekh.
6. The reference teaches products comprising a fabric backing, a layer of abrasive grains, and at least one layer of resin and microspheres adhering the grains to the fabric backing (abstract). The microspheres are analogous to Applicant's claimed geometrically symmetrically shaped particles. The microspheres are present in an amount of about 5 to 20 percent by weight of the resin layer. The abrasive particles are

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also embedded in the resin coating. Thus, the structural limitations of claims 1, 2, 29 and 30 are met.

7. Claim 3 describes the surface smoothness of an intermediate. Hence, the requirements are considered for the influence they have on the structure of the final product. The effects of the intermediate are not seen to differentiate the claimed product over the prior art. The structural limitations of claims 1-2 are met by the prior art as previously described, thus the functional limitations of dependent claim 3 are also met.

8. Regarding claim 4, the microspheres comprise silica (col. 2, lines 59-61).

9. Regarding claims 7 and 8, the microsphere-containing resin is applied to one side of the fabric, therefore covering about 50% of the fabric surface area.

10. Regarding claim 14, a phenolic resin is employed in the prior art (col. 2, lines 53-54).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 4543106 to Parekh, as applied to claim 1 above.

13. Regarding claim 12, the Parekh reference is silent with respect to the size of the abrasive particles. However, it would have been obvious to one of ordinary skill in the

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art to determine the optimal particle size for the particular abrasive needs of the specific intended use. For example, coarser surfaces are desired in heavy duty applications.

Finer surfaces are desired in lighter duty applications. Absent a showing of unexpected results with the claimed particle size, no patentable distinction is seen over the prior art.

14. Regarding claim 15, the Parekh reference does not measure the amount of resin with respect to the final product. It would have been obvious for one of ordinary skill in the art to determine the optimal amount of resin. Absent a showing of unexpected results, the claimed values are not seen to provide patentable distinction over the prior art.

15. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 4543106 to Parekh as applied to claim 1 above, and further in view of US Patent 4927431 to Buchanan.

16. As detailed above, the Parekh reference teaches the structure of claim 1, comprising a phenolic resin make coat. The reference is silent with respect to the composition of the phenolic resin, therefore it would have been necessary to look to the prior art for suitable and conventional materials.

17. The Buchanan reference teaches binder materials for coated abrasives such as the products disclosed by Parekh. The binder composition is a blend of a radiation curable monomer and a thermally curable resinous material (See Buchanan abstract). The blended resin does not include an epoxy modified phenolic resin. However,

Comparative Example E (col. 16) employs an acrylated epoxy/phenolic resin, and the product is compared to the composition taught by Buchanan.

18. While the practitioner in the art may have been motivated to use the advantageous composition taught by Buchanan, which does not include an epoxy modified phenolic resin, the comparative example shows that an epoxy/phenolic resin is known in the art, even if not preferred. Therefore, it appears that an epoxy modified phenolic resin would have been obvious to one of ordinary skill in the art, although perhaps not preferred.

Claim Rejections - 35 USC § 102/103

19. Claims 1-3, 7, 10, 12, 14, 15, 17, 29, and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by, or in the alternative under 35 USC 103(a) as obvious in view of, US Patent 5792544 to Klein.

20. The Klein reference teaches flexible abrasive articles for wet grinding and polishing. The fabric belts and disks have an abrasive layer thereon, with diamond particles distributed throughout (col. 1, lines 5-8). The fabric belt or disk is analogous to the claimed primary layer comprising a fibrous base material. The abrasive layer is analogous to the claimed secondary layer. The crystalline structure of diamond indicates symmetrically shaped particles. The diamond content is between about 11% and 36% of the abrasive layer, which is analogous to the claimed secondary layer. The diamond content of the reference is expressed relative to the abrasive coating, which includes binder resin. Claims 1, 29 and 30, express the geometric particle content

relative to particulate material ONLY; in other words, the claimed ratio does not consider non-particulate elements such as binder. Therefore, a direct comparison of analogous components cannot be made. The prior art does not express the amount of diamond particles relative to ONLY the particulate elements of the coating. The prior art does show that the diamond particles comprise a smaller weight percent than the other particulate elements (col. 2, lines 60-63 for diamond content; col. 3, lines 2-5 for additional particulate content). It also appears from the relative amounts of each particulate component, as described from column 2, line 60 through column 3, line 5, that the amount of diamond particles would fall within the claimed range, which is to say 55% or less, relative to the total particulate content. The burden is shifted to Applicant to prove otherwise. See *In re Fitzgerald*, 205 USPQ 594. In the alternative, it would have been obvious to provide the claimed amount of diamond particles. Note *In re Best*, 195 USPQ 433 (CCPA 1977), as to the providing of this rejection under 35 USC 102, or in the alternative under 35 USC 103(a). Thus, the limitations of claims 1, 29 and 30 are met.

21. Claim 3 describes the surface smoothness of an intermediate. Hence, the requirements are considered for the influence they have on the structure of the final product. The effects of the intermediate are not seen to differentiate the claimed product over the prior art. The structural limitations of claims 1-2 are met by the prior art as previously described, thus the functional limitations of dependent claim 3 are also met.

22. Regarding claims 7 and 8, the limitations are presumed to be met by the prior art, because abrasive belts and disks, such as the ones taught by the prior art, are generally

coated on one side only. The coated side is analogous to an outer surface. The back side or surface of the fibrous backing generally is not coated with abrasive particles, as the back side abuts a tool upon which the belt or disk is mounted for use. Therefore, the reference appears to inherently have approximately 50% of the fabric material covered with the abrasive coating. Exact proportions would be dependent upon fabric thickness, however it can be concluded that the coated surface area would fall within the claimed parameters.

23. Claim 10 describes a weight ratio of friction modifying particles to the weight of the primary layer material. An analogous comparison in the Klein reference is a ratio of the weight of diamond particles to the weight of the fabric. Such a ratio is not explicitly recited in the reference. The weight percent of diamond particles is expressed relative to the abrasive coating, but not with respect to the fabric material. The analogous ratio in the prior art would vary widely. The amount of diamond particles varies with the amount of diamond included in the abrasive coating, which is preferably within 11% to 36% by weight, see col. 2, lines 60-61. The cumulative weight of diamond particles further varies depending on the thickness of the abrasive coating, which is preferably between 1/8 to 1/4 mm (col. 10, lines 29-42). The weight of diamond particles further depends on the number of abrasive coating layers (col. 10, lines 57-65). The ratio would further depend on the weight of the fabric, which is also variable. An exemplary fabric has given dimensions and surface area (col. 12, lines 21-25), but the weight is not disclosed or able to be determined. Based on the widely varying and optimisable amounts of each component, it seems reasonable to presume that the wide range of the

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claim would be met by at least one embodiment. The burden is on Applicant to prove otherwise. See *In re Fitzgerald*, 205 USPQ 594. In the alternative, it would have been obvious to provide the claimed amount of diamond particles. Note *In re Best*, 195 USPQ 433 (CCPA 1977), as to the providing of this rejection under 35 USC 102, or in the alternative under 35 USC 103(a). The same rationale applies to the amount of resin recited in claim 15, because the claimed proportion is based upon the final product. The prior art final product includes the fibrous material, any fillers or resins, the abrasive layer, and the constituents of the abrasive layer (diamond, metal particles, non-metallic particles, filler, binder, etc.).

24. Regarding claim 12, the size of the diamond particles depends upon the ultimate intended grinding use, and may be optimized. Preferably the diamond particles are about 15 to 45 microns (col. 3, lines 43-49), thus overlapping and meeting the claim limitations.

25. Regarding claims 14 and 17, a phenolic/epoxy resin blend is preferred (col. 2, lines 38-45).

Response to Arguments

26. Applicant's arguments, along with the claim amendments, serve to overcome the prior art rejection stated in the previous office action. Upon further review of the prior art Applicant's position, that silica and diatomaceous earth commonly used in the art are typically of irregular shape, appears to be supported. Therefore, the rejection is withdrawn.

Allowable Subject Matter

27. Claims 6, 9, 11,13, 16, and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

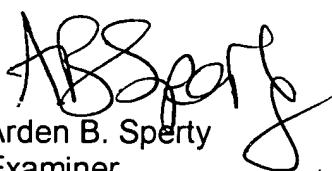
28. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Additional pertinent prior art includes US Patents 6951504, 6217413, 5975988, 3020139, 5777791, 6121168, 6586373, 4490432, and US Publication 2004/0081795.

29. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arden B. Sperty whose telephone number is (571)272-1543. The examiner can normally be reached on M-Th, 08:00-16:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (571)272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Arden B. Sperry
Examiner
Art Unit 1771

February 17, 2006



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